

What is claimed is:

1. A method for transferring a service announcement of Multimedia Broadcast/Multicast Service (MBMS) comprises the following steps:

(a) Broadcast/Multicast Service Center (BM_SC) requests Cell Broadcast Center (CBC) to send a Service Announcement message, wherein said request may include sending times and sending time duration as parameters;

(b) After receiving a message from the BM_SC, the Cell Broadcast Center (CBC) commands UMTS Terrestrial Radio Access Network (UTRAN) connected with it by a message to send the service announcement;

(c) UMTS Terrestrial Radio Access Network (UTRAN) arranges the time for sending the Multimedia Broadcast/Multicast Service (MBMS) service announcement message at one or more schedule periods according to the requirement of Cell Broadcast Center (CBC), adds a brief description information to a schedule message that describes each of the schedule periods and sends the schedule message;

(d) UMTS Terrestrial Radio Access Network (UTRAN) sends the Multimedia Broadcast/Multicast Service (MBMS) service announcement message.

2. The method according to claim 1, wherein transfer times in the step (a) can be a plurality times or infinite times.

3. The method according to claim 1, wherein after finishing sending the Multimedia Broadcast/Multicast Service (MBMS) service announcement message, UMTS Terrestrial Radio Access Network (UTRAN) sends confirmation information to Cell Broadcast Center (CBC).

4. The method according to claim 3, wherein after receiving the confirmation information from UTRAN, Cell Broadcast Center (CBC) returns confirmation information to Broadcast/Multicast Service Center (BM_SC) subsequently.

5. The method according to claim 1, wherein in the step (b), according to the

requirement of Broadcast/Multicast Service Center (BM_SC), Cell Broadcast Center (CBC) can require UMTS Terrestrial Radio Access Network (UTRAN) to send the service announcement periodically a plurality of times or infinite times.

6. The method according to claim 1, wherein in the step (d), UMTS Terrestrial Radio Access Network (UTRAN) sends the Multimedia Broadcast/Multicast Service (MBMS) service announcement message a plurality of times according to the requirement of Cell Broadcast Center (CBC), and the step (c) and the step (d) can be repeated a plurality of times without a certain precedence order.

7. The method according to claim 1, wherein the service announcement message includes parameters of service types and service areas of Multimedia Broadcast/Multicast Service (MBMS).

8. The method according to claim 7, wherein the step of UMTS Terrestrial Radio Access Network (UTRAN) sending a service announcement message that includes the service types and service areas of Multimedia Broadcast/Multicast Service (MBMS) via Cell Broadcast further comprises the following steps:

(1) Multimedia Broadcast/Multicast Service (MBMS) Control Module (MBMSC) receives a signaling message from core network nodes (SGSN, CBC), which informs UMTS Terrestrial Radio Access Network (UTRAN) to send the Multimedia Broadcast/Multicast Service (MBMS) service announcement message;

(2) Multimedia Broadcast/Multicast Service Control Module (MBMSC) requests Broadcast/Multicast Control protocol (BMC) to send the Multimedia Broadcast/Multicast Service (MBMS) service announcement message;

(3) BMC constructs the Multimedia Broadcast/Multicast Service (MBMS) service announcement message and saves it in a sending memory block thereof, and starts up a counter for this message, wherein a initial value of the counter is equal to the required times of sending the message, and if the message is required to be sent infinite times, the initial value of the counter is assigned with zero or negative value;

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(4) BMC estimates a transmission rate (Vneed) needed on CTCH according to all the messages currently saved in the sending memory block, wherein all the messages include the Multimedia Broadcast/Multicast Service (MBMS) service announcement messages and other broadcast messages, and if the actual transmission rate (Vctch) on the CTCH is 0, it means that this cell hasn't allocated CTCH resources and it won't continue to send broadcast message, and if the actual transmission rate is much smaller or larger than that needed on the CTCH, BMC reports the actual required transmission rate to RRC with a primitive and requests RRC to establish or adjust CTCH resources, and during the period of BMC waiting for RRC configuring CTCH resources, if the actual transmission rate does not match with that needed but it isn't equal to zero: when the actual transmission rate is smaller than that needed, BMC may still select some messages with high priority and short length to transfer; when the actual transmission rate is much larger than that needed, BMC also reports to RRC, but at this time, resources on CTCH exceeds the requirement of message transmission, and are wasted;

(5) RRC controls L1 and L2 with a primitive to establish CTCH or adjust CTCH configuration so as to make CTCH transmission rate match, and informs BMC of the new configuration parameters of CTCH with a primitive, and only if the actual transmission rate is not equal to zero, BMC will still continue to send broadcast messages as described in step (4);

(6) BMC adds descriptions for the Multimedia Broadcast/Multicast Service (MBMS) service announcement message to a pending-for-sending schedule message, and then arranges the Multimedia Broadcast/Multicast Service (MBMS) service announcement message on a specific position of the schedule period following the schedule message for future sending;

(7) BMC sends the schedule message;

(8) BMC sends the Multimedia Broadcast/Multicast Service (MBMS) service announcement message at the prescribed time;

(9) After reducing the counter's value by 1, BMC judges: if the value of the counter is negative, it means that the Multimedia Broadcast/Multicast Service (MBMS) service announcement message is required to send for infinite times,

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then proceeding to step (10) after adding 1 to the value of the counter; if the value of the counter is positive, proceeding to step (10) directly; if the value is zero, it means that the times of sending the Multimedia Broadcast/Multicast Service (MBMS) service announcement message has met the requirement, then BMC return the confirmation information to Multimedia Broadcast/Multicast Service Control Module (MBMSC) and the process of sending the Multimedia Broadcast/Multicast Service (MBMS) service announcement for this times is completed;

(10) BMC waits on-timing according to the time interval that Multimedia Broadcast/Multicast Service (MBMS) service announcement message is required to send, and when the time expires for sending a next Multimedia Broadcast/Multicast Service (MBMS) service announcement message, proceeding to step (6).

9. The method according to claim 7, wherein the step of UE receiving the service announcement message for the parameters of the service types and service areas of Multimedia Broadcast/Multicast Service (MBMS) via cell broadcast further comprises the following steps:

(1) Multimedia Broadcast/Multicast Service (MBMS) Service Control Module (MBMSC) sends a request for receiving a Multimedia Broadcast/Multicast Service (MBMS) service announcement message to BMC with a first primitive;

(2) If BMC has never received any broadcast message before, proceeding to step (3); otherwise, proceeding to step 9);

(3) BMC informs RRC to receive a broadcast message with a second primitive, which includes the parameters that can inform RRC to receive BMC preferred message at the prescribed time and to skip some messages;

(4) If RRC has not configured CTCH before, RRC configures link layer (L2) and physical layer (L1) to enable UE to receive information on CTCH and feedbacks necessary CTCH configuration information with a third primitive to BMC at the same time, thereafter proceeding to step (5); if RRC has configured CTCH resources before, proceeding to step (5) directly;

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(5) According to the requirement of BMC, RRC controls L2 and L1 with a fourth primitive to receive cell broadcast information on CTCH at the prescribed time;

5 (6) After processing the data frame received from the CTCH accordingly, L1 and L2 submit the data frame to BMC in the format of BMC message with a fifth primitive;

10 (7) BMC analyses the received message, and if it is a Multimedia Broadcast/Multicast Service (MBMS) service announcement message, BMC forwards it to Multimedia Broadcast/Multicast Service Control Module (MBMSC) with a sixth primitive, and at the same time, reception of this time is completed; if it is not a Multimedia Broadcast/Multicast Service (MBMS) service announcement message, proceeding to step (8);

15 (8) If the message received by BMC is a schedule message, proceeding to step (9); otherwise, proceeding to step (3);

20 (9) BMC analyses the schedule message received most recently, and checks if the schedule period described by the schedule message includes the Multimedia Broadcast/Multicast Service (MBMS) service announcement message, if so, proceeding to step (12); otherwise, BMC finds the position of the next schedule message and requests RRC to receive the next schedule message with the second primitive;

25 (10) RRC controls L1 and L2 with the fourth primitive to receive the next schedule message at the prescribed time;

30 (11) After processing the message received from CTCH accordingly, L1 and L2 forward the schedule message to BMC with the fifth primitive, and then proceeding to step (9);

35 (12) BMC finds the position of the Multimedia Broadcast/Multicast Service (MBMS) service announcement message and requests RRC with the second primitive to receive the Multimedia Broadcast/Multicast Service (MBMS) service announcement message at prescribed time;

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(13) RRC controls L1 and L2 with the fourth primitive to receive Multimedia Broadcast/Multicast Service (MBMS) service announcement message at the prescribed time;

5 (14) After processing the message received from CTCH accordingly, L1 and L2 forward the Multimedia Broadcast/Multicast Service (MBMS) service announcement message to BMC with the fifth primitive;

10 (15) BMC forwards the Multimedia Broadcast/Multicast Service (MBMS) service announcement message to Multimedia Broadcast/Multicast Service (MBMS) Control Module (MBMSC) with the third primitive and the reception for this time is completed.

15 10. A method for transferring a service notification of Multimedia Broadcast/Multicast Service (MBMS) comprises the following steps:

(a) BM_SC sends Multimedia Broadcast/Multicast Service (MBMS) data to GGSN ;

20 (b) After receiving the data sent by BM_SC, GGSN sends the data to SGSN;

(c) After receiving the signals from GGSN, SGSN informs UMTS Terrestrial Radio Access Network (UTRAN) of the forthcoming of the Multimedia Broadcast/Multicast Service (MBMS) data via a signaling message;

25 (d) Radio data Access Bearer (RAB) is established between UMTS Terrestrial Radio Access Network (UTRAN) and SGSN;

30 (e) SGSN sends the Multimedia Broadcast/Multicast Service (MBMS) data to UMTS Terrestrial Radio Access Network (UTRAN) via radio data access bearer (RAB);

35 (f) After receiving the data from SGSN, UMTS Terrestrial Radio Access Network (UTRAN) arranges time for sending the Multimedia Broadcast/Multicast Service (MBMS) service notification message,;

(g) UMTS Terrestrial Radio Access Network (UTRAN) sends the Multimedia

Broadcast/Multicast Service (MBMS) service notification message at a prescribed time;

(h) UE requests UTRAN to allocate radio resources (RB) via a signaling message, and a plurality of other UEs can send requests to UMTS Terrestrial Radio Access Network (UTRAN);

(i) UMTS Terrestrial Radio Access Network (UTRAN) allocates radio bearer (RB) according to the number of UEs;

(j) UMTS Terrestrial Radio Access Network (UTRAN) sends the Multimedia Broadcast/Multicast Service (MBMS) data to UE via RB.

11. The method according to claim 10, wherein the step (e), step (f) and step (g) can be performed without a certain precedence order.

12. The method according to claim 10, wherein the service notification message indicates the forthcoming of specific Multimedia Broadcast/Multicast Service (MBMS) data and includes relevant parameters related to the Multimedia Broadcast/Multicast Service (MBMS).

13. The method according to claim 12, wherein the step of UMTS Terrestrial Radio Access Network (UTRAN) sending the Multimedia Broadcast/Multicast Service (MBMS) service notification message via cell broadcast further comprises the following steps:

(1) Multimedia Broadcast/Multicast Service (MBMS) Service Control Module (MBMSC) receives a signaling message sent from core network node (SGSN, CBC), which informs UMTS Terrestrial Radio Access Network (UTRAN) to perform the process of Multimedia Broadcast/Multicast Service (MBMS) service notification;

(2) Multimedia Broadcast/Multicast Service Control Module (MBMSC) requests Broadcast/Multicast Control protocol (BMC) to send the Multimedia Broadcast/Multicast Service (MBMS) service notification message;

(3) BMC constructs the Multimedia Broadcast/Multicast Service (MBMS)

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service notification message and saves it in a sending memory block thereof;

(4) BMC estimates a transmission rate (Vneed) needed on CTCH according to all the messages currently saved in the sending memory block, all the messages include the Multimedia Broadcast/Multicast Service (MBMS) service notification messages;

(5) RRC controls L1 and L2 with a primitive to establish CTCH or adjust CTCH configuration so as to make CTCH transmission rate match with the transmission rate needed (Vneed), and informs BMC the new configuration parameters of CTCH;

(6) BMC adds descriptions for Multimedia Broadcast/Multicast Service (MBMS) service notification message to a pending-for-sending schedule message, and then BMC arranges the Multimedia Broadcast/Multicast Service (MBMS) service notification message on a specific position of a schedule period following the schedule message for future sending;

(7) BMC sends the schedule message; and

(8) BMC sends the Multimedia Broadcast/Multicast Service (MBMS) service notification message at the prescribed time.

14. The method according to claim 12, wherein the step of UE receiving the Multimedia Broadcast/Multicast Service (MBMS) service notification message via cell broadcast further comprises the following steps:

(1) Multimedia Broadcast/Multicast Service Control Module (MBMSC) sends a request to BMC with a first primitive for receiving a service announcement message or a service notification message of Multimedia Broadcast/Multicast Service (MBMS);

(2) If BMC hasn't received any broadcast message before, proceeding to step (3); otherwise, proceeding to step (9);

(3) BMC informs RRC to receive broadcast message with a second primitive, which includes the parameters that can inform RRC only to receive a BMC

preferred message at the prescribed time and to skip some messages;

(4) If RRC has not configured CTCH before, RRC configures link layer (L2) and physical layer (L1) to enable UE to receive information on the CTCH and feedbacks necessary CTCH configuration information with a third primitive to BMC at the same time, thereafter proceeding to step (5); if RRC has configured CTCH resources before, proceeding to step (5) directly;

(5) According to the requirement of BMC, RRC controls L2 and L1 with a fourth primitive to receive cell broadcast information on the CTCH at the prescribed time;

(6) After processing the data frame received from the CTCH accordingly, L1 and L2 submit it to BMC in the format of BMC message with a fifth primitive;

(7) BMC analyses the received message, and if it is the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS), BMC forwards it to Multimedia Broadcast/Multicast Service Control Module (MBMSC) with a sixth primitive, at the same time the reception is completed; if it is not the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS), proceeding to step (8);

(8) If the message received by BMC is the schedule message, proceeding to step (9); otherwise, proceeding to step (3);

(9) BMC analyses the schedule message that was received most recently, and checks whether the schedule period described by the schedule message includes the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS) or not, and if it is positive, proceeding to step (12), otherwise, BMC finds the position of the next schedule message and requests RRC to receive the next schedule message with the second primitive;

(10) RRC controls L1 and L2 to receive the next schedule message at the prescribe time with the fourth primitive;

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(11) After processing the message received from the CTCH accordingly, L1 and L2 forward the schedule message to BMC with the fifth primitive, and then proceeding to step 9);

5 (12) BMC finds the position of the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message, and requests RRC to receive Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message at the prescribed time with the second primitive;

10 (13) RRC controls L1 and L2 to receive the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message at the prescribed time with the fourth primitive;

15 (14) After processing the message received from the CTCH accordingly, L1 and L2 forward the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message to BMC with the fifth primitive;

20 (15) BMC forwards the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message to Multimedia Broadcast/Multicast Service (MBMS) with the third primitive and the reception is completed.

25 15. A method for transferring a service notification of broadcast service in Multimedia Broadcast/Multicast Service (MBMS) comprises the following steps:

30 (a) BM_SC sends the Multimedia Broadcast/Multicast Service (MBMS) data to GGSN;

(b) After receiving said data sent by BM_SC, GGSN sends said data to SGSN by tunneling technique;

35 (c) After receiving the signals from GGSN, SGSN informs UMTS Terrestrial Radio Access Network (UTRAN) of the forthcoming of the Multimedia Broadcast/Multicast Service (MBMS) data via a signaling message;

(d) establishing Radio data Access Bearer (RAB) between UMTS Terrestrial Radio Access Network (UTRAN) and SGSN;

5 (e) SGSN sends the Multimedia Broadcast/Multicast Service (MBMS) data to UMTS Terrestrial Radio Access Network (UTRAN) via Radio data Access Bearer RAB;

10 (f) UMTS Terrestrial Radio Access Network (UTRAN) arranges the sending time of a Multimedia Broadcast/Multicast Service (MBMS) service notification message;

(g) UMTS Terrestrial Radio Access Network (UTRAN) sends the Multimedia Broadcast/Multicast Service (MBMS) service notification message;

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(h) UMTS Terrestrial Radio Access Network (UTRAN) allocates the radio bearer (RB) according to the number of UEs;

20 (i) UTRAN sends the Multimedia Broadcast/Multicast Service (MBMS) data to the UE via RB.

16. The method according to claim 15, wherein that the step of UMTS Terrestrial Radio Access Network (UTRAN) sending the Multimedia Broadcast/Multicast Service (MBMS) service notification via cell broadcast
25 further comprises the following steps:

(1) Multimedia Broadcast/Multicast Service Control Module (MBMSC) receives a signaling message sent from the core network nodes (SGSN, CBC), which informs UMTS Terrestrial Radio Access Network (UTRAN) to send a service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS);
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(2) Multimedia Broadcast/Multicast Service Control Module (MBMSC) requests Broadcast/Multicast Control protocol (BMC) with a primitive to send the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS);
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(3) BMC constructs the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS);

(4) BMC estimates the transmission rate (V_{need}) needed on the CTCH;

(5) RRC controls L1 and L2 with a primitive to establish CTCH or adjust CTCH configuration to make CTCH transmission rate match;

(6) BMC adds descriptions for the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS) to a pending-for-sending schedule message; and

(7) BMC sends the schedule message; and

(8) BMC sends the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS) at the prescribed time.

17. The method according to claim 15, wherein the step of UE receiving the Multimedia Broadcast/Multicast Service (MBMS) service notification message via Cell Broadcast further comprises the following steps:

(1) Multimedia Broadcast/Multicast Service Control Module (MBMSC) sends a request to BMC with a first primitive for receiving a service announcement message or a service notification message of Multimedia Broadcast/Multicast Service (MBMS);

(2) If BMC hasn't received any broadcast message before, proceeding to step (3); otherwise, proceeding to step (9);

(3) BMC informs RRC to receive broadcast message with a second primitive, which includes the parameters that can inform RRC only to receive a BMC preferred message at the prescribed time and to skip some messages;

(4) If RRC has not configured CTCH before, RRC configures link layer (L2) and physical layer (L1) to enable UE to receive information on the CTCH and feedbacks necessary CTCH configuration information with a third primitive to BMC at the same time, thereafter proceeding to step (5); if RRC has configured

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CTCH resources before, proceeding to step (5) directly;

(5) According to the requirement of BMC, RRC controls L2 and L1 with a fourth primitive to receive cell broadcast information on the CTCH at the prescribed time;

(6) After processing the data frame received from the CTCH accordingly, L1 and L2 submit it to BMC in the format of BMC message with a fifth primitive;

(7) BMC analyses the received message, and if it is the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS), BMC forwards it to Multimedia Broadcast/Multicast Service Control Module (MBMSC) with a sixth primitive, at the same time the reception is completed; if it is not the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS), proceeding to step (8);

(8) If the message received by BMC is the schedule message, proceeding to step (9); otherwise, proceeding to step (3);

(9) BMC analyses the schedule message that was received most recently, and checks whether the schedule period described by the schedule message includes the service announcement message or service notification message of Multimedia Broadcast/Multicast Service (MBMS) or not, and if it is positive, proceeding to step (12), otherwise, BMC finds the position of the next schedule message and requests RRC to receive the next schedule message with the second primitive;

(10) RRC controls L1 and L2 to receive the next schedule message at the prescribe time with the fourth primitive;

(11) After processing the message received from the CTCH accordingly, L1 and L2 forward the schedule message to BMC with the fifth primitive, and then proceeding to step 9);

(12) BMC finds the position of the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message, and

requests RRC to receive Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message at the prescribed time with the second primitive;

5 (13) RRC controls L1 and L2 to receive the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message at the prescribed time with the fourth primitive;

10 (14) After processing the message received from the CTCH accordingly, L1 and L2 forward the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message to BMC with the fifth primitive;

15 (15) BMC forwards the Multimedia Broadcast/Multicast Service (MBMS) service announcement message or service notification message to Multimedia Broadcast/Multicast Service (MBMS) with the third primitive and the reception is completed.

20 18. A method of sending Multimedia Broadcast/Multicast Service (MBMS) multicast service data in a communication system comprises the following steps:

25 sending a service announcement message that includes the parameters of the service types and service areas of Multimedia Broadcast/Multicast Service (MBMS) via cell broadcast;

establishing a transmission bearer for the Multimedia Broadcast/Multicast Service (MBMS) multicast service;

30 sending a service notification information for the arrival of the Multimedia Broadcast/Multicast Service (MBMS) data via cell broadcast;

sending the Multimedia Broadcast/Multicast Service (MBMS) multicast service data; and

35 releasing the transmission bearer after the Multimedia Broadcast/Multicast Service (MBMS) service.

19. A method of receiving Multimedia Broadcast/Multicast Service (MBMS) multicast service data in a communication system comprises the following steps:

5 receiving service announcement information for the parameters of the service types and service areas of Multimedia Broadcast/Multicast Service (MBMS) via cell broadcast;

10 joining a specific Multimedia Broadcast/Multicast Service (MBMS) multicast service;

receiving service notification information for the arrival of Multimedia Broadcast/Multicast Service (MBMS) via a MBMS channel;

15 receiving the Multimedia Broadcast/Multicast Service (MBMS) multicast service data; and

20 releasing the MBMS channel for leaving the specific Multimedia Broadcast/Multicast Service (MBMS) multicast service.

20. A method of sending Multimedia Broadcast/Multicast Service (MBMS) broadcast service data in a communication system comprises the following steps:

25 UMTS Terrestrial Radio Access Network (UTRAN) sends a service announcement message that includes the parameters of the service types and service areas of Multimedia Broadcast/Multicast Service (MBMS) via cell broadcast;

30 UMTS Terrestrial Radio Access Network (UTRAN) and the apparatuses in core network co-establish network resources for the Multimedia Broadcast/Multicast Service (MBMS) broadcast service;

35 UMTS Terrestrial Radio Access Network (UTRAN) sends service notification information for the arrival of the Multimedia Broadcast/Multicast Service (MBMS) data via cell broadcast;

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UMTS Terrestrial Radio Access Network (UTRAN) sends the Multimedia Broadcast/Multicast Service (MBMS) multicast service data; and

5 UMTS Terrestrial Radio Access Network (UTRAN) and other apparatuses in the core network co-release network resources used for the Multimedia Broadcast/Multicast Service (MBMS) broadcast service.

10 21. A method of receiving Multimedia Broadcast/Multicast Service (MBMS) broadcast service data in a communication system comprises the following steps:

15 UE receives service announcement information for the parameters of the service types and service areas of Multimedia Broadcast/Multicast Service (MBMS) via cell broadcast;

UE receives service notification information for the arrival of Multimedia Broadcast/Multicast Service (MBMS) data via cell broadcast;

20 UE receives the Multimedia Broadcast/Multicast Service (MBMS) broadcast service data.